

# **Exhibit U**

# **Data-Over-Cable Service Interface Specifications DOCSIS® 3.1**

## **MAC and Upper Layer Protocols Interface Specification**

**CM-SP-MULPIv3.1-I03-140610**

**ISSUED**

### **Notice**

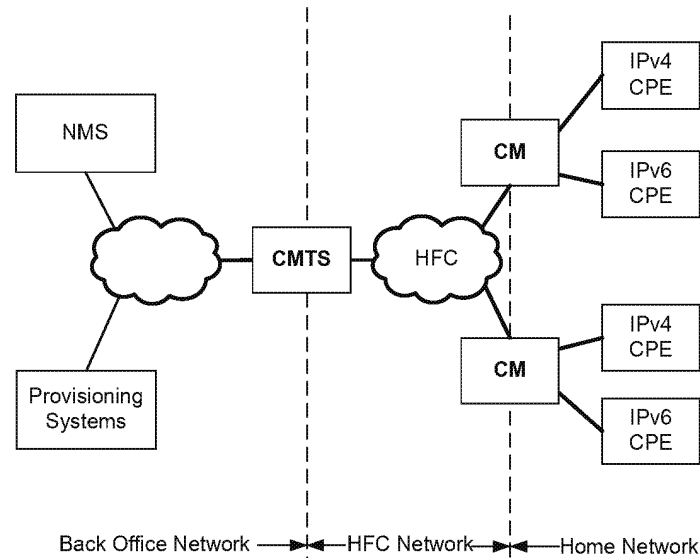
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### 1.2.2 DOCSIS Network and System Architecture

The elements that participate in the provisioning of DOCSIS services are shown in Figure 1-1.



**Figure 1-1 - The DOCSIS Network**

The CM connects to the operator's HFC network and to a home network, bridging packets between them. Many CPE devices can connect to the CM's LAN interfaces, can be embedded with the CM in a single device, or they can be separate standalone devices (as shown in Figure 1-1). CPE devices may use IPv4, IPv6 or both forms of IP addressing. Examples of typical CPE devices are home routers, set-top devices, personal computers, etc.

The CMTS connects the operator's back office and core network with the HFC network. Its main function is to forward packets between these two domains, and optionally forward packets between upstream and downstream channels on the HFC network. The CMTS performs this forwarding with any combination of link-layer (bridging) and network-layer (routing) semantics.

Various applications are used to provide back office configuration and other support to the devices on the DOCSIS network. These applications use IPv4 and/or IPv6 as appropriate to the particular operator's deployment. The following applications include:

#### Provisioning Systems:

- The DHCP servers provide the CM with initial configuration information, including the device IP address(es), when the CM boots.
- The Configuration File server is used to download configuration files to CMs when they boot. Configuration files are in binary format and permit the configuration of the CM's parameters.
- The Software Download server is used to download software upgrades to the CM.
- The Time Protocol server provides Time Protocol clients, typically CMs, with the current time of day.
- Certificate Revocation server provides certificate status.

#### Network Management System (NMS):

- The SNMP Manager allows the operator to configure and monitor SNMP Agents, typically the CM and the CMTS.
- The syslog server collects messages pertaining to the operation of devices.
- The IPDR Collector server allows the operator to collect bulk statistics in an efficient manner.